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(71)Applicant : SONY CORP

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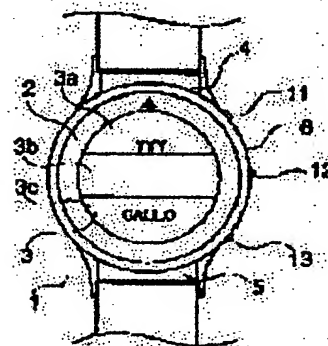
(72)Inventor : IIJIMA YUKO

(54) WRIST WATCH HAVING ROTATION OPERATION MEANS

(57)Abstract:

PROBLEM TO BE SOLVED: To give portability and simplify operation, by providing a rotation operation means rotatably placed around an indication means, externally rotating and receiving desired information and switching functions, and a selection means with functions confirming and selecting the input information.

SOLUTION: A wrist watch 1 is constituted of a jog dial 2 as a rotation operation means, an indication means 3, a function button switch 11 as a selection means, a determination button switch 12, a subfunction button switch 13, etc. The jog dial 2 is rotated when letters and figures are indicated in an indicator 3 and input and functions are switched, for example. The function button switch 11 selects and indicates functions provided in the wrist watch 1. The subfunction button switch 13 indicates subfunction screen for moving in more detailed function of the indicated mode by pressing the function button switch 11. The determination button switch 12 confirms the function indicated by pressing the function button switch 11 or the subfunction button switch 13.



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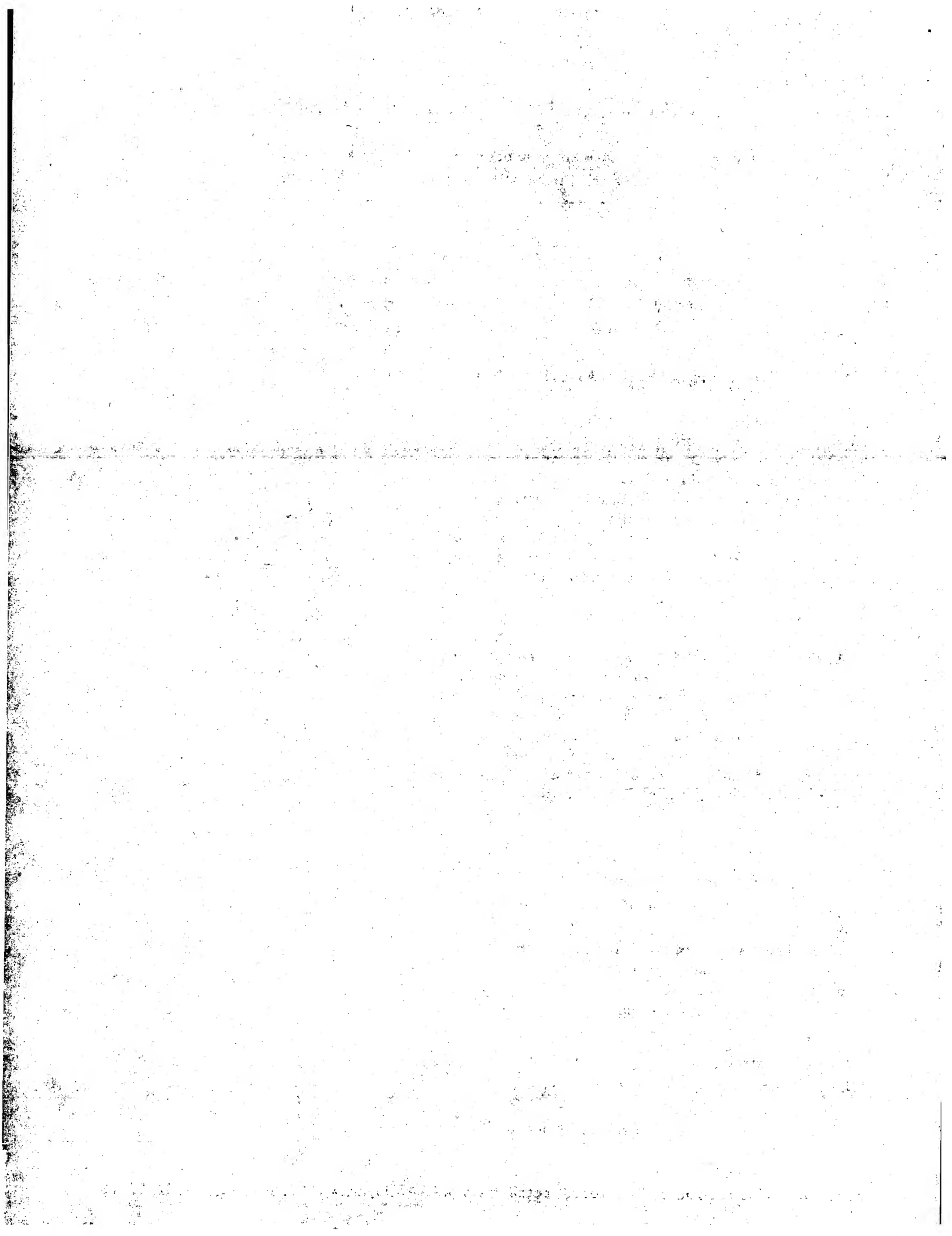
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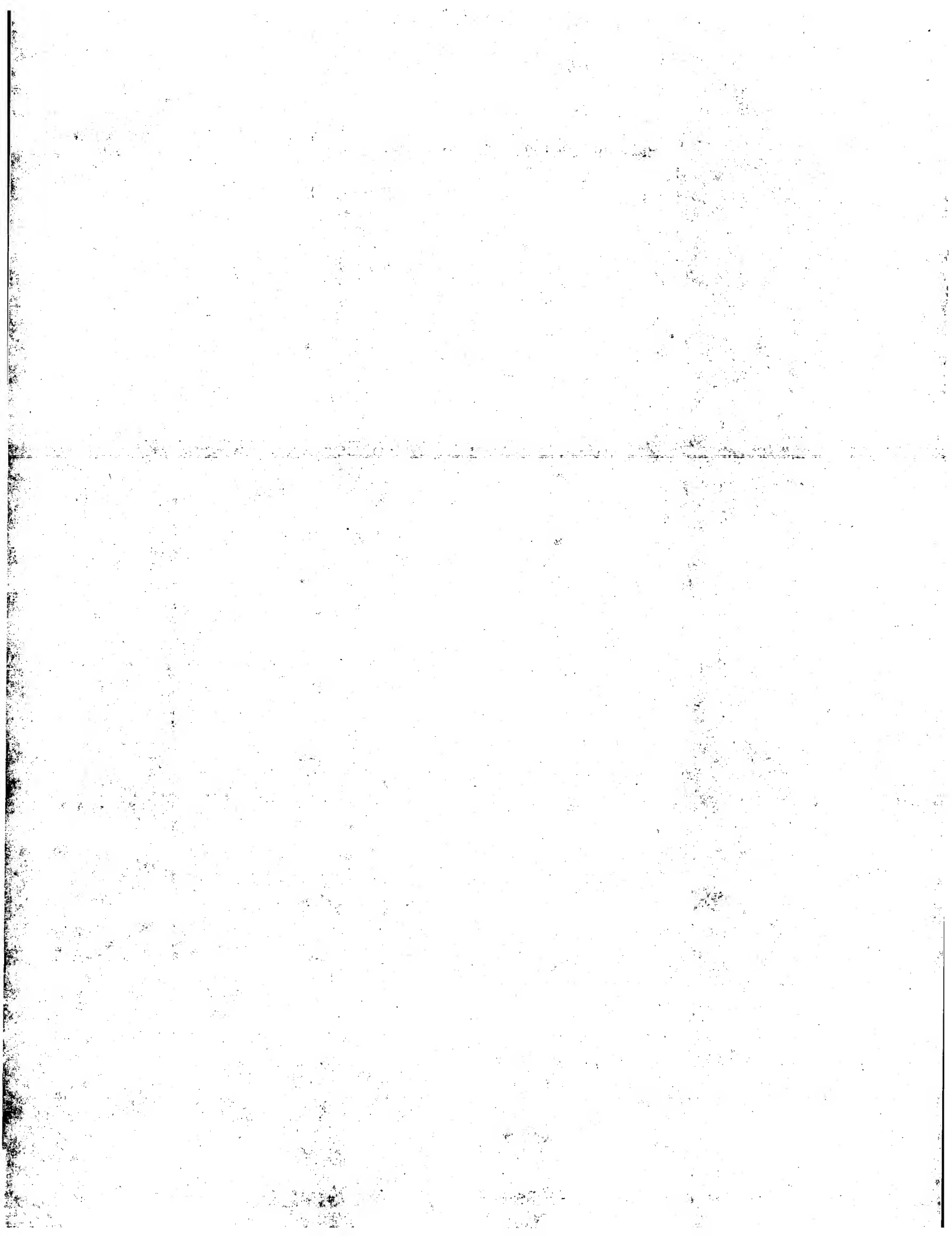
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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] A wrist watch characterized by providing the following. A main part which holds the device section for performing two or more functions containing total tide ability set up beforehand A display means formed in the whole surface of said main part A rotation actuation means for inputting information on desired by being prepared in the perimeter of said display means pivotable, and making it rotate from the outside, or changing a function At least one selection means for starting a function which decided information inputted with said rotation actuation means, or was chosen

[Claim 2] It is the wrist watch according to claim 1 from which said rotation actuation means is a jog dial and which said selection means consists of with a button switch.

[Claim 3] The 1st selection means for said selection means to display at least one function on said display means among said two or more functions, The 2nd selection means for displaying a more detailed function of a function currently displayed with said 1st selection means on said display means, A wrist watch according to claim 1 which consists of the 3rd selection means for considering as the condition of choosing a function displayed with said 1st selection means and/or said 2nd selection means, and using the function.

[Claim 4] Said 1st selection means, said 2nd selection means, and said 3rd selection means are a wrist watch according to claim 3 constituted by button switch, respectively.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the various functions wrist watch which has the external actuation means which can be operated easily.

[0002]

[Description of the Prior Art] Drawing 24 is the plan showing the conventional wrist watch. A wrist watch 101 is a pocket mold clock used by attaching in a user's arm etc. A wrist watch 101 has the belt 107 grade for fixing to an operator the main part 106 which holds the device section of a clock function, the display 103 which is the indicating equipment of a clock function, and a wrist watch 101.

[0003] A main part 106 holds the device section which is the clock function of a wrist watch 101 including the side drum of a wrist watch 101. A display 103 is the display of a wrist watch 101. The display 103 is formed in the surface of a main part 106, and displays time of day etc.

[0004] Button switches 131, 132, 133, and 134 (carbon button) are formed in the peripheral face of a main part 106 like drawing 24. Button switches 135, 136, and 137 (carbon button) are formed in the display 103 bottom of the surface of a main part 106. Here, each button switch has the following functions, for example. A button switch 131 is a button switch for turning on a built-in light. A button switch 132 is a stopwatch functional button switch. Whenever it pushes a button switch 133, it is a button switch for changing and displaying the function with which a wrist watch 101 is equipped. A button switch 134 is a button switch for displaying the telephone number registered in registering the telephone number. A button switch 135 is a button switch for calling the alphabetic character and numeric character which are inputted in case the telephone number is registered to the forward direction. A button switch 136 is a button switch for calling the alphabetic character and numeric character which are inputted in case the telephone number is registered to hard flow. A button switch 137 is a button switch in the case of determining the telephone number and an identifier and performing registration.

[0005] In the configuration of such a wrist watch 101, it is used as follows. Here, the operating instructions which register the telephone number, for example for every identifier are explained. If a button switch 134 is first pushed in order to consider as telephone number register mode, the identifier input column, the telephone number input column, etc. will be displayed on a display 103. It operates the button switch 135 or button switch 136 of one character at a time in this identifier input column, the telephone number input column, etc., and an alphabetic character, a numeric character, etc. are displayed, and it inputs, pushing a button switch 137 and deciding.

[0006] By the way, recently, there is also electronic equipment which has the operating set of the rotating type called the jog dial for being made to do actuation easily. Drawing 25 is the plan showing the electronic equipment which has a jog dial. Below, the telephone equipment of a pocket mold is explained as an example of this electronic equipment. The pocket mold telephone 110 consists of a main part 111, a display 113, and jog dial 102 grade.

[0007] The jog dial 102 is formed in the side of a main part 111 in which the display 113 is formed in the transverse plane, like drawing 25. The jog dial 102 is flat discoid and the part has exposed it to the side of a main part 111. This jog dial 102 is a control unit which a user makes rotate the jog dial 102 and is made to display a desired alphabetic character, a desired numeric character, etc., pushes the jog dial 102 in the direction of X, and decides and inputs it. Since the jog dial 102 exists in the side of a main part 111, it has the feature of being easy to operate a user single hand simply.

[0008]

[Problem(s) to be Solved by the Invention] However, in the telephone equipment 110 of the pocket mold which has the jog dial 102, since the jog dial 102 is in the lateral portion of a main part 111, when holding and carrying in the bag etc., the jog dial 102 may contact lining of a bag, and other hold objects, and may not mean, but may rotate. In addition, when using the telephone equipment 110 of a pocket mold immediately, there was a trouble of ejection ***** from a bag etc. On the other hand, the wrist watch 101 as shown in drawing 24 has the advantage that always carrying is possible and it can be used quickly. However, the wrist watch which has the jog dial 102 as such a rotation actuation means does not recognize current existence. Therefore, electronic equipment always portable in the condition that it can be operated immediately was not known. Then, this invention cancels the above-mentioned technical problem, and always tends to carry it, and it aims at offering the various functions wrist watch which can be operated easily.

[0009]

[Means for Solving the Problem] A main part which holds the device section for performing two or more functions containing total tide ability set up beforehand if the above-mentioned purpose is in this invention, A rotation actuation means for inputting information on desired by being prepared in the perimeter of a display means formed in the whole surface of said main part, and said display means pivotable, and making it rotate from the outside, or changing a function, It is attained by wrist watch characterized by having at least one selection means for starting a function which decided information inputted with said rotation actuation means, or was chosen.

[0010] Since a rotation actuation means can be rotated and a request can be operated in this invention when a wrist watch has a rotation actuation means and a user operates it, actuation of a wrist watch is easy. Moreover, in this invention, since it is a wrist watch, it can always carry and can use quickly to use. Moreover, since it is not necessary to carry this wrist watch in a bag etc., it does not rotate, without a rotation actuation means meaning.

[0011]

[Embodiment of the Invention] Hereafter, the gestalt of suitable implementation of this invention is explained to details based on an accompanying drawing. In addition, since the gestalt of the operation described below is the suitable example of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these gestalten, as long as there is no publication of the purport which limits this invention in the following explanation.

[0012] In the following explanation, "the side front of a wrist watch" shall be a time stamp side side, and the opposite side shall be indicated to be a "background." Moreover, the "mode" means an usable condition for the function with which the wrist watch set up beforehand is equipped by actuation of an operator. Drawing 1 (A) is the plan showing sheathing of the wrist watch which is the desirable operation gestalt of this invention, and drawing 1 (B) is the A-A outline cross section of the wrist watch of drawing 1 (A). A wrist watch 1 As the main part 51 and the rotation actuation means which the device section 50 and the device section 50 were held like drawing 1 As the ** jog dial 2, the display 3 as a display means, a loudspeaker 4, a microphone 5, the side drum 6, a belt 7, and 1st selection means It consists of sub functional button switch 13 grades as the ***** button switch 11, the decision button switch 12 as 3rd selection means, and 2nd selection means.

[0013] The device section 50 builds in the hardware which constitutes the electronic function inside the wrist watch 1 of drawing 1 like drawing 2 . As hardware which constitutes the internal function of a wrist watch 1, they are Bus BS, the functional button switch 11, the decision button switch 12, the sub functional button switch 13, the transceiver circuit section 14, CPU15, ROM16, RAM17 and EEPROM18, a display 3, a loudspeaker 4, a microphone 5, the jog dial 2, the touch panel 23 containing an actuation implement, and controller 24 grade.

[0014] It connects with the functional button switch 11, the decision button switch 12, the sub functional button switch 13, the transceiver circuit section 14, CPU15, ROM16, RAM17 and EEPROM18, a display 3, a loudspeaker 4, the microphone 5, the jog dial 2, the touch panel 23 containing an actuation implement, and the controller 24 grade

electrically, and Bus BS is the passage section of the data for pass the information from each portion.

[0015] The transceiver circuit section 14 is an electronic circuitry for the communication link for performing a communication link with the telephone mode which a wrist watch 1 mentions later. The transceiver circuit section 14 is a circuit to operate by control of CPU15 and for Antenna AN perform radio communications via a public line. CPU15 (Central Processing Unit) is the central data-processing section for giving a command to each portion connected to Bus BS, and controlling the wrist watch 1 whole. ROM16 stores the information for controlling a wrist watch 1, and information is required of it from CPU15 grade. RAM17 (Random Access Memory) is written in and is information storage data medium which can be read. RAM17 is also the working area of CPU15.

[0016] EEPROM18 (Electrically Erasable Programmable Read Only Memory) is a rewritable read-only information record medium, and is information storage data medium which stored the function (program) with which this wrist watch 1 is equipped. As a function with which EEPROM18 is equipped, it has the computation section 31, the translation processing section 32, the clock function part 33, the game function part 34, the speech recognition section 35, the character recognition section 36, the communications control section 37, the telephone number Management Department 38, and jog dial control-section 39 grade like drawing 3. Reading appearance of EEPROM18 is carried out by the demand of CPU15 in these functions. In addition, since EEPROM18 can be rewritten, it can also add a function new in deleting the existing function.

[0017] The computation section 31 is a program for operating a count function at the time of computation mode. The translation processing section 32 is a program for operating a translation function at the time of translation mode. It is a program for operating a clock function at the time of the clock function part 33 and clock mode. It is a program for operating a game function at the time of the game function part 34 and game mode.

[0018] The speech recognition section 35 is a program for recognizing voice at the time of computation mode or translation mode etc. The speech recognition section 35 recognizes the voice inputted from the microphone 5. It is a program for recognizing an alphabetic character at the time of the character recognition section 36, computation mode, or translation mode etc. The character recognition section 36 recognizes the alphabetic character inputted into the touch panel 23 by the actuation implement of a pen mold.

[0019] The communications control section 37 is a program for communicating at the

time of telephone mode etc. The communications control section 37 controls the transceiver circuit section 14 by the command of CPU15. The telephone number Management Department 38 is a program for using it at the time of telephone mode, registering the telephone number or reading the telephone number. The jog dial control section 39 is a control section for controlling the jog dial 2. The jog dial control section 39 displays the alphabetic character and function which were beforehand set up with the rotation of the jog dial 2 on a display 3.

[0020] A display 3, a loudspeaker 4, a microphone 5, the jog dial 2, and the touch panel 23 containing an actuation implement are as having mentioned above. A controller 24 omits and packs each controller which controls the touch panel 23 grade containing the display 3 and loudspeaker 4 which are connected to Bus BS, a microphone 5, the jog dial 2, and an actuation implement, represents it with drawing 2, and is expressed as one controller.

[0021] The jog dial 2 is the operating set which can be chosen by making it rotate when display an alphabetic character and a numeric character on a display 3, and inputting or changing a function. The jog dial 2 has dial section 2b arranged between displays 3 along with the inner circumference section of the side drum 6 like drawing 1 (A). This dial section 2b is arranged free [rotation] in each direction of R1 and R2 to the side drum 6. It has the 2nd disc-like member 9 which becomes with dial section 2b as that circumferential wall was described above and by which the whole became by the flat closed-end cylinder pair like drawing 1 (B) in this jog dial 2, and the pars basilaris ossis occipitalis has been arranged so that it may hold in the 1st member 8 which becomes by disk 2a, and the side drum 6, a slight distance may be kept between the 1st member 8 and it may pile up. Disk 2b as this 2nd member 9 is being fixed so that it may not rotate within the side drum 6.

[0022] Two or more counterelectrodes two a1 which are 2 sets of electrodes, an inner circumference side and a periphery side, are formed in disk 2a like drawing 4 (A), and two or more counterelectrode 2bs1 which are 2 sets of electrodes as well as disk 2b are formed like drawing 4 (B). The counterelectrode two a1 of this disk 2a is in contact with counterelectrode 2b1 of disk 2b possible [sliding], when the jog dial 2 is assembled. To being arranged in the location to which two electrodes which constitute a counterelectrode two a1 were regarded from the central point 0 like drawing 4 (A), and it was mostly equal, the electrode which constitutes counterelectrode 2b1 shifts to a circumferencial direction somewhat, and is arranged. Both two electrodes of a counterelectrode two a1 are grounded.

[0023] The principle of operation of the jog dial 2 is briefly explained with reference to

drawing 4 (A) and drawing 4 (B). If R 2-way is made to rotate the jog dial 2 (disk 2a which is a movable side), as for the potential outputted from counterelectrode 2b1, the potential by the side of inner circumference will fall to touch-down potential previously. Conversely, if two is rotated in the Rjog dial 1 direction, as for the potential outputted from counterelectrode 2b1, the potential by the side of a periphery will fall to touch-down potential previously. This detects to which the jog dial 2 rotated. On the other hand, the rotation of the jog dial 2 is detected by counting the pulse number outputted from counterelectrode 2b1 by the side of a periphery. The alphabetic character displayed on a display 3 with this rotation is beforehand determined by the jog dial control section 39 of drawing 3.

[0024] A display 3 is for displaying the screen of a function established in the wrist watch 1 by control of CPU15. The display 3 equips the drawing 1 space upper layer side with the touch panel 23 as a pointing device for inputting hand lettering for an alphabetic character, a numeric character, etc. by the control unit of a predetermined pen mold. A touch panel 23 is a touch panel of for example, a pen touch mold. A touch panel 23 is an input unit which recognizes the alphabetic character inputted when the panel by which the laminating was carried out to vertical abbreviation two-layer contacted by the character recognition section 36 by writing in the position of a touch panel 23 in the control unit which carried out the configuration where the point of for example, a pen mold sharpened. A touch panel 23 is a transparent member and the liquid crystal display is arranged at the lower layer. Thereby, the liquid crystal display driven by the device section 50 is checked by looking through the transparent touch panel 23.

[0025] A loudspeaker 4 is the voice output section for outputting voice from a wrist watch 1. The loudspeaker 4 is arranged at the lower part of a display 3. A microphone 5 is the voice input section for inputting voice to a wrist watch 1. The microphone 5 is arranged in the upper part of a display 3. In the case of the telephone mode later mentioned by separating mutually and being arranged, a loudspeaker 4 and a microphone 5 have good operability. The side drum 6 is a part for the side drum section of the main part 51 which serves as the case of a wrist watch 1. The belt 7 is the same as that of the installation means of the conventional wrist watch.

[0026] The functional button switch 11 is a button switch for choosing and displaying the function prepared in the wrist watch 1, and displays the function set up beforehand one after another by pushing once. Drawing 5 · drawing 8 are the examples of a display of the display 3 which displayed each function at the time of pushing the functional button switch 11. The example of a display is as follows, for example.

[0027] In the state of the clock function mode display of drawing 1 , if the functional button switch 11 is pushed, it will become telephone mode like drawing 5 , and it can perform telephoning etc. If the functional button switch 11 is pushed in this condition, it will become translation mode like drawing 6 for translating the language inputted from the microphone 5 of a wrist watch 1. Furthermore, if the functional button switch 11 is pushed in this condition, it will become computation mode like drawing 7 for performing computation etc. Moreover, if the functional button switch 11 is pushed in this condition, it will become game mode like drawing 8 which can enjoy an electronic game etc. If the functional button switch 11 is further pushed in this condition, it will return to the clock function mode of drawing 1 .

[0028] The sub functional button switch 13 is a button switch which displays a sub functional screen, in order to start the still more detailed function (sub function) in the mode displayed by pushing the functional button switch 11. The decision button switch 12 is a button switch for deciding the function displayed by pushing the functional button switch 11 or the sub functional button switch 13, and making the function of a wrist watch 1 into the mode. The functional button switch 11, the decision button switch 12, and the sub functional button switch 13 have a respectively electric contact, and CPU15 recognizes it as the switch being turned on.

[0029] The wrist watch 1 of this operation gestalt is constituted as mentioned above, and explains the operating instructions of this wrist watch 1 below. In the following explanation, although a term called the field is used, the "field" shall be set to the display 3 or touchpad 23 of a wrist watch 1, and the unit for 1 character which displays or inputs an alphabetic character etc. shall be said. Moreover, in drawing referred to in the following explanation, the place which attached the underline shows the location of the input column in each mode which can be inputted. In addition, this underline is cursor.

[0030] Example 1 of actuation Telephone number register mode drawing 9 - drawing 11 are flow charts which show the operating instructions of the telephone number register mode which is one function of a wrist watch 1. Drawing 12 - drawing 16 show the display condition of the telephone mode screen in the display 3 in number register mode. Hereafter, these drawings are used and the operating instructions of the wrist watch 1 at the time of telephone number register mode are explained.

[0031] A step ST 1, step ST 2 If the functional button switch 11 is pushed in the state of the clock mode in which it goes into telephone mode, a telephone mode screen like drawing 5 will be displayed on a display 3 (step ST 1). "Y" showing for example, an electric wave condition is displayed on display up 3a. It expresses that an electric wave

condition is so good that there is "much Y." Next, a push on the decision button switch 12 displays a telephone mode screen. If the decision button switch 12 is pushed, it will go into telephone mode (step ST 2).

[0032] A step ST 3, step ST 4 A push on the sub functional button switch 13 included in telephone number register mode displays the detailed function in telephone mode. If the sub functional button switch 13 is furthermore pushed, another sub functions (for example, vibrator setting up function for telling arrival of the mail by vibration etc.) will be displayed. Telephone number register mode is explained especially here. If the decision button switch 12 is pushed as a sub function where a telephone number register mode screen is displayed (step ST 3), it will go into telephone number register mode like drawing 12 (step ST 4).

[0033] A step ST 5, a step ST 6, step ST 7 If an identifier is gone into input telephone number register mode, cursor is arranged like drawing 12 at display CHUBU ENGINEERING CORPORATION 3b. The cursor location has become like display CHUBU ENGINEERING CORPORATION 3b of the cage by which inverse video is carried out, for example, and drawing 12. In this condition, if the jog dial 2 is rotated, the alphabetic character of the predetermined sequence set up to compensate for rotation of the jog dial 2 etc. will be displayed. If a desired alphabetic character etc. is displayed, by pushing the decision button switch 12, a user will be determined one character and will move to the next field (for example, right) like drawing 13. And if the last alphabetic character is displayed, the input of (step ST8) and an identifier will be ended by pushing the decision button switch 12 twice, for example. After the input of an identifier is completed, cursor moves to display lower 3c like drawing 14.

[0034] A step ST 9, a step ST 10, step ST 11 It is the column into which input display lower 3c inputs the telephone number for the telephone number. Here, the telephone number is inputted with a jog dial like drawing 15 like the alphabetic character input mentioned above. The input method is the same as that of the input of an identifier (a step ST 9, a step ST 10). If the last numeric character is inputted, the decision button switch 12 will be pushed twice (step ST 12).

[0035] A step ST 13, a step ST 14, step ST 15 After the input of the input telephone number ends a registration number, cursor moves to display up 3a like drawing 16. Display up 3a is a column which inputs a registration number. Here, the telephone number is inputted with a jog dial like drawing 17 like the alphabetic character input mentioned above. If the last numeric character is inputted, the decision button switch 12 will be pushed twice (step ST 16). Actuation of telephone number register mode is completed above. In addition, although entry sequence is explained in order of an

identifier, the telephone number, and a registration number, it is not restricted to this.

[0036] Example 2 of actuation Answering machine playback mode drawing 19 and drawing 20 are flow charts which show the operating instructions of the answering machine playback mode which is still more nearly another sub function in the telephone mode of a wrist watch 1.

A step ST 20, step ST 21 A push on input function 11 button switch displays a telephone mode screen like drawing 5 on a display 3 in a registration number (step ST 20). It is as being displayed on display up 3a and having mentioned the contents above. It goes into telephone mode by pushing the decision button switch 12 (step ST 21).

[0037] A step ST 22, step ST 23 A push on the sub functional button switch 3 included in an answering machine playback mode displays the still more detailed function in telephone mode. If the sub functional button switch 3 is furthermore pushed, the following sub function will be displayed. An answering machine playback mode is explained especially here. the condition (step 22) of having displayed the answering machine mode screen as a sub function -- the decision button switch 12 -- pushing (step ST 23) -- it goes into an answering machine playback mode.

[0038] Step 24, 25, 26, and STs 27 The connection jog dial 2 to the number management pin center,large of answering machines is rotated, and the telephone number of an answering machine management pin center,large is displayed like drawing 21 (step ST 24). Next, the decision button switch 12 is pushed, telecommunication dispatching is taken out from CPU15 to the transceiver circuit section 14, and it connects with an answering machine management pin center,large (step ST 25). A wrist watch 1 receives an answering machine number of registration like drawing 5 , cuts a communication link (step ST 26), and displays the number on a display 3 (step ST 27).

[0039] Step 28, 29, 30, and STs 31 The connection jog dial 2 to an answering machine pin center,large is rotated, and the telephone number of an answering machine pin center,large is displayed like drawing 21 (step ST 28). Next, if the decision button switch 12 is pushed, telecommunication dispatching will be taken out from CPU15 to the transceiver circuit section 14, and it will connect with an answering machine pin center,large (step ST 29). A wrist watch 1 receives the contents data of an answering machine like drawing 5 , cuts a communication link (step ST 30), and outputs the contents from a loudspeaker 4 (step ST 31). In addition, although it is separate, an answering machine management pin center,large and an answering machine pin center,large shall be included also when unified. In this case, the count of a communication link can be managed at once.

[0040] According to the operation gestalt of this invention, since the jog dial 2 is formed

in the wrist watch 1, actuation is easy for it.

[0041] By the way, this invention is not limited to the operation gestalt mentioned above. In the gestalt of above-mentioned operation, you may constitute so that it may have two or more other functions, without the device section's 50 having total tide ability. In this case, although it is no longer a clock, this invention does not ask what kind of name it is, but is applied also to such electronic equipment. Furthermore, although it has three selection means, you may have three or more selection means, and less than three selection means may constitute from the wrist watch which is the gestalt of desirable implementation of this invention. Although the input of the alphabetic character by the jog dial 2, a numeric character, etc. explains only telephone mode, it is used in the modes other than telephone mode.

[0042] The example of use of a jog dial is not restricted for seeing, although mentioned above.

The jog dial 2 is used for setting up whether the stopwatch function in clock mode clock mode is made usable (ON/OFF).

[0043] You may apply to displaying ON or OFF by rotating the jog dial 2 for whether vibrator ability is used in the vibrator setting up function in telephone mode telephone mode (ON/OFF).

The jog dial 2 uses it also for the display of the translating agency language in translation mode translation mode, or the language after a translation.

[0044] When carrying out computer mode count, the jog dial 2 is used for writing in a touch panel 23 with the actuation implement of voice input mode (display of the mark of opening of display up 3a of drawing 7), and a pen mold which carries out a numeric character input by voice input from a microphone 5, and changing the character recognition input mode (display of the mark of the pencil of display up 3a of drawing 22) to which character recognition of the numeric character is carried out.

[0045]

[Effect of the Invention] As explained above, according to this invention, it is always easy to carry and the various functions wrist watch which can be operated easily can be offered.

TECHNICAL FIELD

[The technical field to which invention belongs] This invention relates to the various functions wrist watch which has the external actuation means which can be operated easily.

PRIOR ART

[Description of the Prior Art] Drawing 24 is the plan showing the conventional wrist watch. A wrist watch 101 is a pocket mold clock used by attaching in a user's arm etc. A wrist watch 101 has the belt 107 grade for fixing to an operator the main part 106 which holds the device section of a clock function, the display 103 which is the indicating equipment of a clock function, and a wrist watch 101.

[0003] A main part 106 holds the device section which is the clock function of a wrist watch 101 including the side drum of a wrist watch 101. A display 103 is the display of a wrist watch 101. The display 103 is formed in the surface of a main part 106, and displays time of day etc.

[0004] Button switches 131, 132, 133, and 134 (carbon button) are formed in the peripheral face of a main part 106 like drawing 24. Button switches 135, 136, and 137 (carbon button) are formed in the display 103 bottom of the surface of a main part 106. Here, each button switch has the following functions, for example. A button switch 131 is a button switch for turning on a built-in light. A button switch 132 is a stopwatch functional button switch. Whenever it pushes a button switch 133, it is a button switch for changing and displaying the function with which a wrist watch 101 is equipped. A button switch 134 is a button switch for displaying the telephone number registered in registering the telephone number. A button switch 135 is a button switch for calling the alphabetic character and numeric character which are inputted in case the telephone number is registered to the forward direction. A button switch 136 is a button switch for calling the alphabetic character and numeric character which are inputted in case the telephone number is registered to hard flow. A button switch 137 is a button switch in the case of determining the telephone number and an identifier and performing registration.

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set of the rotating type called the jog dial for being made to do actuation easily. Drawing 25 is the plan showing the electronic equipment which has a jog dial. Below, the telephone equipment of a pocket mold is explained as an example of this electronic equipment. The pocket mold telephone 110 consists of a main part 111, a display 113, and jog dial 102 grade.

[0007] The jog dial 102 is formed in the side of a main part 111 in which the display 113 is formed in the transverse plane, like drawing 25. The jog dial 102 is flat discoid and the part has exposed it to the side of a main part 111. This jog dial 102 is a control unit which a user makes rotate the jog dial 102 and is made to display a desired alphabetic character, a desired numeric character, etc., pushes the jog dial 102 in the direction of X, and decides and inputs it. Since the jog dial 102 exists in the side of a main part 111, it has the feature of being easy to operate a user single hand simply.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to this invention, it is always easy to carry and the various functions wrist watch which can be operated easily can be offered.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the telephone equipment 110 of the pocket mold which has the jog dial 102, since the jog dial 102 is in the lateral portion of a main part 111, when holding and carrying in the bag etc., the jog dial 102 may contact lining of a bag, and other hold objects, and may not mean, but may rotate. In addition, when using the telephone equipment 110 of a pocket mold immediately, there was a trouble of ejection ***** from a bag etc. On the other hand, the wrist watch 101 as shown in drawing 24 has the advantage that always carrying is possible and it can be used quickly. However, the wrist watch which has the jog dial 102 as such a rotation actuation means does not recognize current existence. Therefore, electronic equipment always portable in the condition that it can be operated immediately was not known. Then, this invention cancels the above-mentioned technical problem, and always tends to carry it, and it aims at offering the various functions wrist watch which can be operated easily.

MEANS

[Means for Solving the Problem] A main part which holds the device section for performing two or more functions containing total tide ability set up beforehand if the above-mentioned purpose is in this invention, A rotation actuation means for inputting information on desired by being prepared in the perimeter of a display means formed in the whole surface of said main part, and said display means pivotable, and making it rotate from the outside, or changing a function, It is attained by wrist watch characterized by having at least one selection means for starting a function which decided information inputted with said rotation actuation means, or was chosen.

[0010] Since a rotation actuation means can be rotated and a request can be operated in this invention when a wrist watch has a rotation actuation means and a user operates it, actuation of a wrist watch is easy. Moreover, in this invention, since it is a wrist watch, it can always carry and can use quickly to use. Moreover, since it is not necessary to carry this wrist watch in a bag etc., it does not rotate, without a rotation actuation means meaning.

[0011]

[Embodiment of the Invention] Hereafter, the gestalt of suitable implementation of this invention is explained to details based on an accompanying drawing. In addition, since the gestalt of the operation described below is the suitable example of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these gestalten, as long as there is no publication of the purport which limits this invention in the following explanation.

[0012] In the following explanation, "the side front of a wrist watch" shall be a time stamp side side, and the opposite side shall be indicated to be a "background." Moreover, the "mode" means an usable condition for the function with which the wrist watch set up beforehand is equipped by actuation of an operator. Drawing 1 (A) is the plan showing sheathing of the wrist watch which is the desirable operation gestalt of this invention, and drawing 1 (B) is the A-A outline cross section of the wrist watch of drawing 1 (A). A wrist watch 1 As the main part 51 and the rotation actuation means which the device section 50 and the device section 50 were held like drawing 1 As the** jog dial 2, the display 3 as a display means, a loudspeaker 4, a microphone 5, the side drum 6, a belt 7, and 1st selection means It consists of sub functional button switch 13 grades as the ***** button switch 11, the decision button switch 12 as 3rd selection means, and 2nd selection means.

[0013] The device section 50 builds in the hardware which constitutes the electronic

function inside the wrist watch 1 of drawing 1 like drawing 2 . As hardware which constitutes the internal function of a wrist watch 1, they are Bus BS, the functional button switch 11, the decision button switch 12, the sub functional button switch 13, the transceiver circuit section 14, CPU15, ROM16, RAM17 and EEPROM18, a display 3, a loudspeaker 4, a microphone 5, the jog dial 2, the touch panel 23 containing an actuation implement, and controller 24 grade.

[0014] It connects with the functional button switch 11, the decision button switch 12, the sub functional button switch 13, the transceiver circuit section 14, CPU15, ROM16, RAM17 and EEPROM18, a display 3, a loudspeaker 4, the microphone 5, the jog dial 2, the touch panel 23 containing an actuation implement, and the controller 24 grade electrically, and Bus BS is the passage section of the data for pass the information from each portion.

[0015] The transceiver circuit section 14 is an electronic circuitry for the communication link for performing a communication link with the telephone mode which a wrist watch 1 mentions later. The transceiver circuit section 14 is a circuit to operate by control of CPU15 and for Antenna AN perform radio communications via a public line. CPU15 (Central Processing Unit) is the central data-processing section for giving a command to each portion connected to Bus BS, and controlling the wrist watch 1 whole. ROM16 stores the information for controlling a wrist watch 1, and information is required of it from CPU15 grade. RAM17 (Random Access Memory) is written in and is information storage data medium which can be read. RAM17 is also the working area of CPU15.

[0016] EEPROM18 (Electrically Erasable Programmable Read Only Memory) is a rewritable read-only information record medium, and is information storage data medium which stored the function (program) with which this wrist watch 1 is equipped. As a function with which EEPROM18 is equipped, it has the computation section 31, the translation processing section 32, the clock function part 33, the game function part 34, the speech recognition section 35, the character recognition section 36, the communications control section 37, the telephone number Management Department 38, and jog dial control section 39 grade like drawing 3 . Reading appearance of EEPROM18 is carried out by the demand of CPU15 in these functions. In addition, since EEPROM18 can be rewritten, it can also add a function new in deleting the existing function.

[0017] The computation section 31 is a program for operating a count function at the time of computation mode. The translation processing section 32 is a program for operating a translation function at the time of translation mode. It is a program for operating a clock function at the time of the clock function part 33 and clock mode. It is

a program for operating a game function at the time of the game function part 34 and game mode.

[0018] The speech recognition section 35 is a program for recognizing voice at the time of computation mode or translation mode etc. The speech recognition section 35 recognizes the voice inputted from the microphone 5. It is a program for recognizing an alphabetic character at the time of the character recognition section 36, computation mode, or translation mode etc. The character recognition section 36 recognizes the alphabetic character inputted into the touch panel 23 by the actuation implement of a pen mold.

[0019] The communications control section 37 is a program for communicating at the time of telephone mode etc. The communications control section 37 controls the transceiver circuit section 14 by the command of CPU15. The telephone number Management Department 38 is a program for using it at the time of telephone mode, registering the telephone number or reading the telephone number. The jog dial control section 39 is a control section for controlling the jog dial 2. The jog dial control section 39 displays the alphabetic character and function which were beforehand set up with the rotation of the jog dial 2 on a display 3.

[0020] A display 3, a loudspeaker 4, a microphone 5, the jog dial 2, and the touch panel 23 containing an actuation implement are as having mentioned above. A controller 24 omits and packs each controller which controls the touch panel 23 grade containing the display 3 and loudspeaker 4 which are connected to Bus BS, a microphone 5, the jog dial 2, and an actuation implement, represents it with drawing 2, and is expressed as one controller.

[0021] The jog dial 2 is the operating set which can be chosen by making it rotate when display an alphabetic character and a numeric character on a display 3, and inputting or changing a function. The jog dial 2 has dial section 2b arranged between displays 3 along with the inner circumference section of the side drum 6 like drawing 1 (A). This dial section 2b is arranged free [rotation] in each direction of R1 and R2 to the side drum 6. It has the 2nd disc-like member 9 which becomes with dial section 2b as that circumferential wall was described above and by which the whole became by the flat closed-end cylinder pair like drawing 1 (B) in this jog dial 2, and the pars basilaris ossis occipitalis has been arranged so that it may hold in the 1st member 8 which becomes by disk 2a, and the side drum 6, a slight distance may be kept between the 1st member 8 and it may pile up. Disk 2b as this 2nd member 9 is being fixed so that it may not rotate within the side drum 6.

[0022] Two or more counterelectrodes two a1 which are 2 sets of electrodes, an inner

circumference side and a periphery side, are formed in disk 2a like drawing 4 (A), and two or more counterelectrode 2bs1 which are 2 sets of electrodes as well as disk 2b are formed like drawing 4 (B). The counterelectrode two a1 of this disk 2a is in contact with counterelectrode 2b1 of disk 2b possible [sliding], when the jog dial 2 is assembled. To being arranged in the location to which two electrodes which constitute a counterelectrode two a1 were regarded from the central point 0 like drawing 4 (A), and it was mostly equal, the electrode which constitutes counterelectrode 2b1 shifts to a circumferencial direction somewhat, and is arranged. Both two electrodes of a counterelectrode two a1 are grounded.

[0023] The principle of operation of the jog dial 2 is briefly explained with reference to drawing 4 (A) and drawing 4 (B). If R 2-way is made to rotate the jog dial 2 (disk 2a which is a movable side), as for the potential outputted from counterelectrode 2b1, the potential by the side of inner circumference will fall to touch-down-potential previously. Conversely, if two is rotated in the Rjog dial 1 direction, as for the potential outputted from counterelectrode 2b1, the potential by the side of a periphery will fall to touch-down potential previously. This detects to which the jog dial 2 rotated. On the other hand, the rotation of the jog dial 2 is detected by counting the pulse number outputted from counterelectrode 2b1 by the side of a periphery. The alphabetic character displayed on a display 3 with this rotation is beforehand determined by the jog dial control section 39 of drawing 3.

[0024] A display 3 is for displaying the screen of a function established in the wrist watch 1 by control of CPU15. The display 3 equips the drawing 1 space upper layer side with the touch panel 23 as a pointing device for inputting hand lettering for an alphabetic character, a numeric character, etc. by the control unit of a predetermined pen mold. A touch panel 23 is a touch panel of for example, a pen touch mold. A touch panel 23 is an input unit which recognizes the alphabetic character inputted when the panel by which the laminating was carried out to vertical abbreviation two-layer contacted by the character recognition section 36 by writing in the position of a touch panel 23 in the control unit which carried out the configuration where the point of for example, a pen mold sharpened. A touch panel 23 is a transparent member and the liquid crystal display is arranged at the lower layer. Thereby, the liquid crystal display driven by the device section 50 is checked by looking through the transparent touch panel 23.

[0025] A loudspeaker 4 is the voice output section for outputting voice from a wrist watch 1. The loudspeaker 4 is arranged at the lower part of a display 3. A microphone 5 is the voice input section for inputting voice to a wrist watch 1. The microphone 5 is

arranged in the upper part of a display 3. In the case of the telephone mode later mentioned by separating mutually and being arranged, a loudspeaker 4 and a microphone 5 have good operability. The side drum 6 is a part for the side drum section of the main part 51 which serves as the case of a wrist watch 1. The belt 7 is the same as that of the installation means of the conventional wrist watch.

[0026] The functional button switch 11 is a button switch for choosing and displaying the function prepared in the wrist watch 1, and displays the function set up beforehand one after another by pushing once. Drawing 5 - drawing 8 are the examples of a display of the display 3 which displayed each function at the time of pushing the functional button switch 11. The example of a display is as follows, for example.

[0027] In the state of the clock function mode display of drawing 1, if the functional button switch 11 is pushed, it will become telephone mode like drawing 5, and it can perform telephoning etc. If the functional button switch 11 is pushed in this condition, it will become translation mode like drawing 6 for translating the language inputted from the microphone 5 of a wrist watch 1. Furthermore, if the functional button switch 11 is pushed in this condition, it will become computation mode like drawing 7 for performing computation etc. Moreover, if the functional button switch 11 is pushed in this condition, it will become game mode like drawing 8 which can enjoy an electronic game etc. If the functional button switch 11 is further pushed in this condition, it will return to the clock function mode of drawing 1.

[0028] The sub functional button switch 13 is a button switch which displays a sub functional screen, in order to start the still more detailed function (sub function) in the mode displayed by pushing the functional button switch 11. The decision button switch 12 is a button switch for deciding the function displayed by pushing the functional button switch 11 or the sub functional button switch 13, and making the function of a wrist watch 1 into the mode. The functional button switch 11, the decision button switch 12, and the sub functional button switch 13 have a respectively electric contact, and CPU15 recognizes it as the switch being turned on.

[0029] The wrist watch 1 of this operation gestalt is constituted as mentioned above, and explains the operating instructions of this wrist watch 1 below. In the following explanation, although a term called the field is used, the "field" shall be set to the display 3 or touchpad 23 of a wrist watch 1, and the unit for 1 character which displays or inputs an alphabetic character etc. shall be said. Moreover, in drawing referred to in the following explanation, the place which attached the underline shows the location of the input column in each mode which can be inputted. In addition, this underline is cursor.

[0030] Example 1 of actuation Telephone number register mode drawing 9 · drawing 11 are flow charts which show the operating instructions of the telephone number register mode which is one function of a wrist watch 1. Drawing 12 · drawing 16 show the display condition of the telephone mode screen in the display 3 in number register mode. Hereafter, these drawings are used and the operating instructions of the wrist watch 1 at the time of telephone number register mode are explained.

[0031] A step ST 1, step ST 2 If the functional button switch 11 is pushed in the state of the clock mode in which it goes into telephone mode, a telephone mode screen like drawing 5 will be displayed on a display 3 (step ST 1). "Y" showing for example, an electric wave condition is displayed on display up 3a. It expresses that an electric wave condition is so good that there is "much Y." Next, a push on the decision button switch 12 displays a telephone mode screen. If the decision button switch 12 is pushed, it will go into telephone mode (step ST 2).

[0032] A step ST 3, step ST 4 A push on the sub functional button switch 13 included in telephone number register mode displays the detailed function in telephone mode. If the sub functional button switch 13 is furthermore pushed, another sub functions (for example, vibrator setting up function for telling arrival of the mail by vibration etc.) will be displayed. Telephone number register mode is explained especially here. If the decision button switch 12 is pushed as a sub function where a telephone number register mode screen is displayed (step ST 3), it will go into telephone number register mode like drawing 12 (step ST 4).

[0033] A step ST 5, a step ST 6, step ST 7 If an identifier is gone into input telephone number register mode, cursor is arranged like drawing 12 at display CHUBU ENGINEERING CORPORATION 3b. The cursor location has become like display CHUBU ENGINEERING CORPORATION 3b of the cage by which inverse video is carried out, for example, and drawing 12. In this condition, if the jog dial 2 is rotated, the alphabetic character of the predetermined sequence set up to compensate for rotation of the jog dial 2 etc. will be displayed. If a desired alphabetic character etc. is displayed, by pushing the decision button switch 12, a user will be determined one character and will move to the next field (for example, right) like drawing 13. And if the last alphabetic character is displayed, the input of (step ST8) and an identifier will be ended by pushing the decision button switch 12 twice, for example. After the input of an identifier is completed, cursor moves to display lower 3c like drawing 14.

[0034] A step ST 9, a step ST 10, step ST 11 It is the column into which input display lower 3c inputs the telephone number for the telephone number. Here, the telephone number is inputted with a jog dial like drawing 15 like the alphabetic character input

mentioned above. The input method is the same as that of the input of an identifier (a step ST 9, a step ST 10). If the last numeric character is inputted, the decision button switch 12 will be pushed twice (step ST 12).

[0035] A step ST 13, a step ST 14, step ST 15 After the input of the input telephone number ends a registration number, cursor moves to display up 3a like drawing 16 . Display up 3a is a column which inputs a registration number. Here, the telephone number is inputted with a jog dial like drawing 17 like the alphabetic character input mentioned above. If the last numeric character is inputted, the decision button switch 12 will be pushed twice (step ST 16). Actuation of telephone number register mode is completed above. In addition, although entry sequence is explained in order of an identifier, the telephone number, and a registration number, it is not restricted to this.

[0036] Example 2 of actuation Answering machine playback mode drawing 19 and drawing 20 are flow charts which show the operating instructions of the answering machine playback mode which is still more nearly another sub function in the telephone mode of a wrist watch 1.

A step ST 20, step ST 21 A push on input function 11 button switch displays a telephone mode screen like drawing 5 on a display 3 in a registration number (step ST 20). It is as being displayed on display up 3a and having mentioned the contents above. It goes into telephone mode by pushing the decision button switch 12 (step ST 21).

[0037] A step ST 22, step ST 23 A push on the sub functional button switch 3 included in an answering machine playback mode displays the still more detailed function in telephone mode. If the sub functional button switch 3 is furthermore pushed, the following sub function will be displayed. An answering machine playback mode is explained especially here. the condition (step 22) of having displayed the answering machine mode screen as a sub function -- the decision button switch 12 -- pushing (step ST 23) -- it goes into an answering machine playback mode.

[0038] Step 24, 25, 26, and STs 27 The connection jog dial 2 to the number management pin center, large of answering machines is rotated, and the telephone number of an answering machine management pin center, large is displayed like drawing 21 (step ST 24). Next, the decision button switch 12 is pushed, telecommunication dispatching is taken out from CPU15 to the transceiver circuit section 14, and it connects with an answering machine management pin center, large (step ST 25). A wrist watch 1 receives an answering machine number of registration like drawing 5 , cuts a communication link (step ST 26), and displays the number on a display 3 (step ST 27).

[0039] Step 28, 29, 30, and STs 31 The connection jog dial 2 to an answering machine pin center, large is rotated, and the telephone number of an answering machine pin

center, large is displayed like drawing 21 (step ST 28). Next, if the decision button switch 12 is pushed, telecommunication dispatching will be taken out from CPU15 to the transceiver circuit section 14, and it will connect with an answering machine pin center, large (step ST 29). A wrist watch 1 receives the contents data of an answering machine like drawing 5, cuts a communication link (step ST 30), and outputs the contents from a loudspeaker 4 (step ST 31). In addition, although it is separate, an answering machine management pin center, large and an answering machine pin center, large shall be included also when unified. In this case, the count of a communication link can be managed at once.

[0040] According to the operation gestalt of this invention, since the jog dial 2 is formed in the wrist watch 1, actuation is easy for it.

[0041] By the way, this invention is not limited to the operation gestalt mentioned above. In the gestalt of above-mentioned operation, you may constitute so that it may have two or more other functions, without the device section's 50 having total tide ability. In this case, although it is no longer a clock, this invention does not ask what kind of name it is, but is applied also to such electronic equipment. Furthermore, although it has three selection means, you may have three or more selection means, and less than three selection means may constitute from the wrist watch which is the gestalt of desirable implementation of this invention. Although the input of the alphabetic character by the jog dial 2, a numeric character, etc. explains only telephone mode, it is used in the modes other than telephone mode.

[0042] The example of use of a jog dial is not restricted for seeing, although mentioned above.

The jog dial 2 is used for setting up whether the stopwatch function in clock mode clock mode is made usable (ON/OFF).

[0043] You may apply to displaying ON or OFF by rotating the jog dial 2 for whether vibrator ability is used in the vibrator setting up function in telephone mode telephone mode (ON/OFF).

The jog dial 2 uses it also for the display of the translating agency language in translation mode translation mode, or the language after a translation.

[0044] When carrying out computer mode count, the jog dial 2 is used for writing in a touch panel 23 with the actuation implement of voice input mode (display of the mark of opening of display up 3a of drawing 7), and a pen mold which carries out a numeric character input by voice input from a microphone 5, and changing the character recognition input mode (display of the mark of the pencil of display up 3a of drawing

22) to which character recognition of the numeric character is carried out.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The plan showing the wrist watch which is the desirable operation gestalt of this invention.

[Drawing 2] Hardware configuration drawing showing the electronic function inside the wrist watch of drawing 1.

[Drawing 3] Software configuration drawing showing the function stored in EEPROM of drawing 2.

[Drawing 4] The plan showing the device of the jog dial of drawing 1.

[Drawing 5] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 6] The plan showing the translation mode screen of the wrist watch of drawing 1.

[Drawing 7] The plan showing the computation mode screen of the wrist watch of drawing 1.

[Drawing 8] The plan showing the game mode screen of the wrist watch of drawing 1.

[Drawing 9] The flow chart which shows the operating instructions of the telephone number register mode in the telephone mode with which the wrist watch of drawing 1 is equipped.

[Drawing 10] The flow chart which shows a continuation of the flow chart of drawing 9.

[Drawing 11] The flow chart which shows a continuation of the flow chart of drawing 10.

[Drawing 12] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 13] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 14] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 15] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 16] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 17] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 18] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 19] The flow chart which shows the operating instructions of the answering machine playback mode in the telephone mode with which the wrist watch of drawing 1 is equipped.

[Drawing 20] The flow chart which shows a continuation of the flow chart of drawing 19.

[Drawing 21] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 22] The plan showing the clock mode screen of the wrist watch of drawing 1.

[Drawing 23] The plan showing the clock mode screen of the wrist watch of drawing 1 .

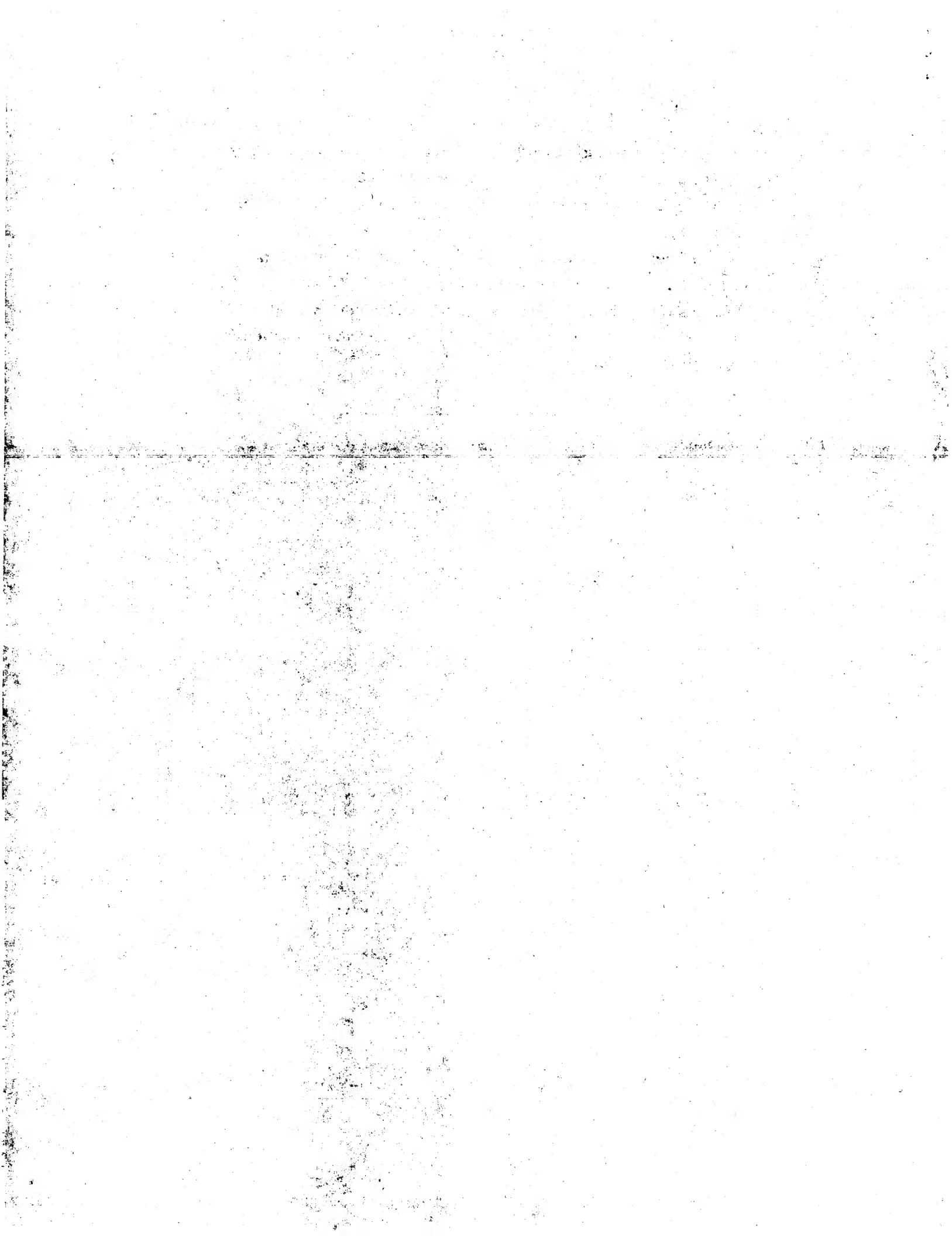
[Drawing 24] The plan showing the conventional wrist watch.

[Drawing 25] The plan showing the conventional pocket mold electronic equipment.

[Description of Notations]

1 [... A functional button switch (the 1st selection means, selection means), 12 / ... A decision button switch (the 3rd selection means, selection means), 13 / ... A sub functional button switch (the 2nd selection means, selection means), 50 / ... The device section, 51 / ... Main part] ... A wrist watch, 2 ... A jog dial (rotation actuation means), 3 ... Display 11 (display means)

[Translation done.]



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(71) 出願人 000002185

ソニー株式会社

東京都品川区北品川6丁目7番35号

(72) 発明者 飯島 祐子

東京都品川区北品川6丁目7番35号 ソニー株式会社内

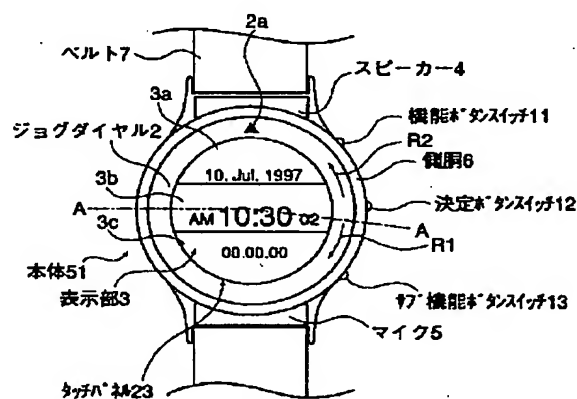
(74) 代理人 弁理士 岡▲崎▼ 信太郎 (外1名)

(54) 【発明の名称】 回転操作手段を有する腕時計

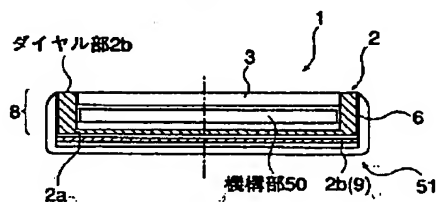
(57) 【要約】

【課題】 常時携帯しやすく、簡単に操作することのできる多機能な腕時計を提供すること。

【解決手段】 計時機能を含む予め設定された複数の機能を実行するための機構部50を収容する本体51と、前記本体51の一面に設けられている表示手段3と、前記表示手段3の周囲に回転可能に設けられており、外部から回転させることにより所望の情報を入力したり機能を切り替えるための回転操作手段2と、前記回転操作手段2により入力した情報を確定したり選択した機能に入るための少なくとも1つの選択手段とを設ける。



(A)



(B)

【特許請求の範囲】

【請求項1】 計時機能を含む予め設定された複数の機能を実行するための機構部を収容する本体と、前記本体の一面に設けられている表示手段と、前記表示手段の周囲に回転可能に設けられており、外部から回転させることにより所望の情報を入力したり機能を切り替えるための回転操作手段と、前記回転操作手段により入力した情報を確定したり選択した機能に入るための少なくとも1つの選択手段とを有することを特徴とする腕時計。

【請求項2】 前記回転操作手段はジョグダイヤルであり、前記選択手段はボタンスイッチにより構成されている請求項1に記載の腕時計。

【請求項3】 前記選択手段は、前記複数の機能のうち少なくとも一つの機能を前記表示手段に表示するための第1の選択手段と、前記第1の選択手段で表示されている機能のより詳細な機能を前記表示手段に表示するための第2の選択手段と、前記第1の選択手段及び／又は前記第2の選択手段にて表示された機能を選択し、その機能を使用する状態とするための第3の選択手段とから構成される請求項1に記載の腕時計。

【請求項4】 前記第1の選択手段、前記第2の選択手段、及び前記第3の選択手段は、それぞれボタンスイッチにより構成される請求項3に記載の腕時計。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 この発明は、簡単に操作できる外部操作手段を有する多機能な腕時計に関するものである。

【0002】

【従来の技術】 図24は、従来の腕時計を示す平面図である。腕時計101は、使用者の腕等に取り付けることにより使用する携帯型時計である。腕時計101は、時計機能の機構部を収容する本体106、時計機能の表示装置である表示部103、及び腕時計101を操作者に固定するためのベルト107等を有する。

【0003】 本体106は、腕時計101の側胴を含み、腕時計101の時計機能である機構部を収容する。表示部103は、腕時計101の表示装置である。表示装置103は、本体106の表面に設けられており、時刻等を表示する。

【0004】 本体106の外周面には、図24のようにボタンスイッチ131、132、133、134（ボタン）が設けられている。本体106の表面の表示部103の下側には、ボタンスイッチ135、136、137（ボタン）が設けられている。ここで、各ボタンスイッチは、例えば以下のような機能を有している。ボタンスイッチ131は、内蔵ライトを点灯するためのボタンス

イッチである。ボタンスイッチ132は、ストップウォッチ機能ボタンスイッチである。ボタンスイッチ133は、押すごとに腕時計101が備える機能を切り替え表示するためのボタンスイッチである。ボタンスイッチ134は、電話番号を登録したり、登録済みの電話番号を表示するためのボタンスイッチである。ボタンスイッチ135は、電話番号を登録する際に入力する文字や数字を順方向に呼び出すためのボタンスイッチである。ボタンスイッチ136は、電話番号を登録する際に入力する文字や数字を逆方向に呼び出すためのボタンスイッチである。ボタンスイッチ137は、電話番号や名前を決定して登録を実行する場合のボタンスイッチである。

【0005】 このような腕時計101の構成において、例えば、以下のように使用する。ここでは、例えば名前に電話番号を登録する操作方法について説明する。電話番号登録モードとするため、まずボタンスイッチ134を押すと、表示部103に名前入力欄と電話番号入力欄等が表示される。この名前入力欄と電話番号入力欄等に1文字ずつボタンスイッチ135又はボタンスイッチ136を操作して文字や数字等を表示させ、ボタンスイッチ137を押して確定しながら入力する。

【0006】 ところで、最近では、容易に操作ができるようにするためのジョグダイヤルと呼ばれる回転式の操作装置を有する電子機器もある。図25は、ジョグダイヤルを有する電子機器を示す平面図である。以下では、この電子機器の一例として携帯型の電話装置について説明する。携帯型電話110は、本体111、表示部113、及びジョグダイヤル102等から構成されている。

【0007】 ジョグダイヤル102は、図25のように表示部113が正面に設けられている本体111の側面に設けられている。ジョグダイヤル102は偏平な円盤状であり、本体111の側面にその一部が露出している。このジョグダイヤル102は、使用者がジョグダイヤル102を回転させて所望の文字や数字等を表示させ、ジョグダイヤル102をX方向に押して確定して入力する操作部である。ジョグダイヤル102は本体111の側面に存在しているため、使用者が片手で簡単に操作しやすいという特徴がある。

【0008】

【発明が解決しようとする課題】 ところが、ジョグダイヤル102を有する携帯型の電話装置110においては、ジョグダイヤル102が本体111の側面部にあるため鞆等に収容して携帯している場合に、ジョグダイヤル102が鞆の内張りや、他の収容物と接触して意図せず回転してしまう場合がある。その他、緊急に携帯型の電話装置110を使うときには鞆等から取り出しづらいという問題点があった。一方、図24に示したような腕時計101は常時携帯することが可能であり、素早く使用することができるという利点がある。ところが、このような回転操作手段としてのジョグダイヤル102を有

する腕時計は、現在存在しない。従って、すぐに操作できる状態で常時携帯できる電子機器は、知られていなかった。そこでこの発明は上記課題を解消し、常時携帯しやすく、簡単に操作することのできる多機能な腕時計を提供することを目的としている。

【0009】

【課題を解決するための手段】上記目的は、この発明にあっては、計時機能を含む予め設定された複数の機能を実行するための機構部を収容する本体と、前記本体の一面に設けられている表示手段と、前記表示手段の周囲に回転可能に設けられており、外部から回転させることにより所望の情報を入力したり機能を切り替えるための回転操作手段と、前記回転操作手段により入力した情報を確定したり選択した機能に入るための少なくとも1つの選択手段とを有することを特徴とする腕時計により達成される。

【0010】この発明では、腕時計は回転操作手段を有しており、使用者が操作する場合には回転操作手段を回転させて所望の操作をすることができるので、腕時計の操作が簡単である。また、この発明では、腕時計であるので常時携帯することができ、使いたいときに素早く使うことができる。また、この腕時計は鞆等に携帯する必要がないため、回転操作手段が意図せずに回転してしまうことがない。

【0011】

【発明の実施の形態】以下、この発明の好適な実施の形態を添付図面に基づいて詳細に説明する。なお、以下に述べる実施の形態は、この発明の好適な具体例であるから、技術的に好ましい種々の限定が付されているが、この発明の範囲は、以下の説明において特にこの発明を限定する旨の記載がない限り、これらの形態に限られるものではない。

【0012】以下の説明において、「腕時計の表側」とは時刻表示面側であり、「裏側」とはその反対側を示すものとする。また、「モード」とは、予め設定された腕時計が備える機能を操作者の操作により使用可能な状態をいう。図1(A)は、この発明の好ましい実施形態である腕時計の外装を示す平面図であり、図1(B)は、図1(A)の腕時計のA-A概略断面図である。腕時計1は、図1のように機構部50、機構部50が収容された本体51、回転操作手段としてのジョグダイヤル2、表示手段としての表示部3、スピーカ4、マイク5、側胴6、ベルト7、第1の選択手段としての機能ボタンスイッチ11、第3の選択手段としての決定ボタンスイッチ12、及び第2の選択手段としてのサブ機能ボタンスイッチ13等から構成されている。

【0013】機構部50は、図2のように図1の腕時計1の内部の電子的な機能を構成するハードウェアを内蔵している。腕時計1の内部機能を構成するハードウェアとしては、バスBS、機能ボタンスイッチ11、決定ボ

タンスイッチ12、サブ機能ボタンスイッチ13、送受信回路部14、CPU15、ROM16、RAM17、EEPROM18、表示部3、スピーカ4、マイク5、ジョグダイヤル2、操作具を含むタッチパネル23、コントローラ24等である。

【0014】バスBSは、機能ボタンスイッチ11、決定ボタンスイッチ12、サブ機能ボタンスイッチ13、送受信回路部14、CPU15、ROM16、RAM17、EEPROM18、表示部3、スピーカ4、マイク5、ジョグダイヤル2、操作具を含むタッチパネル23、コントローラ24等に電氣的に接続されており、それぞれの部分からの情報を通過させるためのデータの通過部である。

【0015】送受信回路部14は、腕時計1の後述する電話モードでの通信を行うための通信用の電子回路である。送受信回路部14は、CPU15の制御により動作し、アンテナANにより公衆回線を経由して無線通信を行うための回路である。CPU15(Central Processing Unit)は、バスBSに接続された各部分に対して指令を与え、腕時計1全体を制御するための中央演算処理部である。ROM16は、例えば腕時計1を制御するための情報を格納しており、CPU15等から情報を要求される。RAM17(Random Access Memory)は、書き込み、読み出し自在な情報記憶媒体である。RAM17は、CPU15の作業領域でもある。

【0016】EEPROM18(Electrically Erasable Programmable Read Only Memory)は、例えば書き換え可能な読み出し専用情報記録媒体であり、この腕時計1が備える機能(プログラム)を格納した情報記憶媒体である。EEPROM18が備える機能としては、図3のように計算処理部31、翻訳処理部32、時計機能部33、ゲーム機能部34、音声認識部35、文字認識部36、通信制御部37、電話番号管理部38、ジョグダイヤル制御部39等を有する。EEPROM18は、CPU15の要求によりこれらの機能を読み出される。尚、EEPROM18は、書き換えることができるため、既存の機能を削除したり新規の機能を追加することも可能である。

【0017】計算処理部31は、計算モード時に計算機能を動作させるためのプログラムである。翻訳処理部32は、翻訳モード時に翻訳機能を動作させるためのプログラムである。時計機能部33、時計モード時に時計機能を動作させるためのプログラムである。ゲーム機能部34、ゲームモード時にゲーム機能を動作させるためのプログラムである。

【0018】音声認識部35は、計算モードや翻訳モード時等に音声を認識するためのプログラムである。音声認識部35は、マイク5から入力された音声等を認識す

る。文字認識部 36、計算モードや翻訳モード時等に文字を認識するためのプログラムである。文字認識部 36は、ペン型の操作具によりタッチパネル 23 に入力された文字等を認識する。

【0019】通信制御部 37は、電話モード時等に通信を行うためのプログラムである。通信制御部 37は、CPU 15の指令により送受信回路部 14を制御する。電話番号管理部 38は、電話モード時に使用し電話番号を登録したり、電話番号を読み出すためのプログラムである。ジョグダイヤル制御部 39は、ジョグダイヤル 2を制御するための制御部である。ジョグダイヤル制御部 39は、ジョグダイヤル 2の回転量により予め設定された文字や機能を表示部 3に表示する。

【0020】表示部 3、スピーカー 4、マイク 5、ジョグダイヤル 2、操作具を含むタッチパネル 23は、前述したとおりである。コントローラ 24は、バス BSに接続されている表示部 3、スピーカー 4、マイク 5、ジョグダイヤル 2、操作具を含むタッチパネル 23等を制御する各コントローラを省略してまとめたものであり、図 2では代表して 1つのコントローラとして表現している。

【0021】ジョグダイヤル 2は、例えば文字や数字を表示部 3に表示して入力したり、機能を切り替える場合に回転させることにより選択することができる操作装置である。ジョグダイヤル 2は、例えば図 1 (A) のように側胴 6の内周部に沿って表示部 3との間に配置されたダイヤル部 2bを有している。このダイヤル部 2bは、側胴 6に対して R1、R2のそれぞれの方向に回転自在に配置されている。このジョグダイヤル 2は、図 1

(B) のように全体が扁平な有底円筒対でなり、その周壁部は上記したようにダイヤル部 2bでなり、底部が円盤 2aでなる第 1の部材 8と、側胴 6内に收容され、第 1の部材 8との間にわずかな距離をおいて重ね合わされるように配置された円盤状の第 2の部材 9とを備えている。この第 2の部材 9としての円盤 2bは、側胴 6内で回転しないように固定されている。

【0022】図 4 (A) のように、円盤 2aには内周側と外周側の 2組の電極である対向電極 2a1が複数設けられており、図 4 (B) のように、円盤 2bには同じく 2組の電極である対向電極 2b1が複数設けられている。この円盤 2aの対向電極 2a1は、ジョグダイヤル 2を組み立てた場合に円盤 2bの対向電極 2b1と摺動可能に接している。対向電極 2a1を構成する 2つの電極は、図 4 (A) のように中心点 Oから見てほぼそろった位置に配置されているのに対して、対向電極 2b1を構成する電極は、円周方向に多少ずれて配置されている。対向電極 2a1の 2つの電極は、共に接地されている。

【0023】ジョグダイヤル 2の動作原理を、図 4

(A) 及び図 4 (B) を参照して簡単に説明する。ジョ

グダイヤル 2 (の可動側である円盤 2a) を R2方向に回転させると、対向電極 2b1から出力される電位は、内周側の電位が先に接地電位に立ち下がる。逆にジョグダイヤル 2を R1方向に回転させると、対向電極 2b1から出力される電位は、外周側の電位が先に接地電位に立ち下がる。これにより、ジョグダイヤル 2がどちらに回転されたかを検出する。一方、ジョグダイヤル 2の回転量は、例えば外周側の対向電極 2b1から出力されるパルス数をカウントすることにより検出する。この回転量により、表示部 3に表示する文字等が図 3のジョグダイヤル制御部 39により予め決められている。

【0024】表示部 3は、CPU 15の制御により腕時計 1に設けられている機能の画面を表示するためのものである。表示部 3は、その図 1紙面上層側には、文字や数字等を所定のペン型の操作部により手書き文字を入力するためのポインティングデバイスとしてのタッチパネル 23を備えている。タッチパネル 23は、例えばペンタッチ型のタッチパネルである。タッチパネル 23は、例えばペン型の先の尖った形状をした操作部にてタッチパネル 23の所定の位置に書き込むことにより、上下略 2層に積層されたパネルが接触することにより入力した文字等を文字認識部 36により認識する入力装置である。タッチパネル 23は透明な部材であり、その下層には液晶ディスプレイが配置されている。これにより、機構部 50により駆動された液晶表示が透明なタッチパネル 23を介して視認されるようになっている。

【0025】スピーカ 4は、腕時計 1から音声を出力するための音声出力部である。スピーカ 4は、例えば表示部 3の下部に配置されている。マイク 5は、腕時計 1に対して音声を入力するための音声入力部である。マイク 5は、例えば表示部 3の上部に配置されている。スピーカ 4とマイク 5は、互いに離れて配置されることにより後述する電話モードの場合に操作性がよい。側胴 6は、腕時計 1のケースを兼ねる本体 51の側胴部分である。ベルト 7は、従来の腕時計の取り付け手段と同様である。

【0026】機能ボタンスイッチ 11は、腕時計 1に設けられている機能を選択して表示させるためのボタンスイッチであり、1回押すことにより次々に予め設定された機能を表示する。図 5～図 8は、機能ボタンスイッチ 11を押した場合の各機能を表示した表示部 3の表示例である。表示例は、例えば以下のようなものである。

【0027】図 1の時計機能モード表示状態で、機能ボタンスイッチ 11を押すと図 5のように電話モードとなり、電話をかけること等ができる。この状態で機能ボタンスイッチ 11を押すと、腕時計 1のマイク 5から入力した言葉等を翻訳するための図 6のような翻訳モードとなる。さらに、この状態で機能ボタンスイッチ 11を押すと、計算処理等を行うための図 7のような計算モードとなる。また、この状態で機能ボタンスイッチ 11を押

すと、電子ゲーム等を楽しむことができる図8のようなゲームモードとなる。この状態でさらに機能ボタンスイッチ11を押すと、図1の時計機能モードに戻る。

【0028】サブ機能ボタンスイッチ13は、機能ボタンスイッチ11を押すことにより表示したモードのさらに詳細な機能（サブ機能）に入るためにサブ機能画面を表示するボタンスイッチである。決定ボタンスイッチ12は、機能ボタンスイッチ11、又はサブ機能ボタンスイッチ13を押すことにより表示された機能を確定し、腕時計1の機能をそのモードとするためのボタンスイッチである。機能ボタンスイッチ11、決定ボタンスイッチ12、及びサブ機能ボタンスイッチ13は、それぞれ電気的な接点を有し、そのスイッチが入るとCPU15が認識するものである。

【0029】この実施形態の腕時計1は、以上のように構成されており、次にこの腕時計1の操作方法について説明する。以下の説明において、フィールドという用語を使用するが、「フィールド」とは、腕時計1の表示部3またはタッチパッド23において、文字等を表示または入力する1字分の単位をいうものとする。また、以下の説明において参照する図において、下線を付した所が各モードにおける入力欄の入力可能位置を示す。尚、この下線は、カーソルである。

【0030】操作例1 電話番号登録モード

図9～図11は、腕時計1の1機能である電話番号登録モードの操作方法を示すフローチャートである。図12～図16は、番号登録モードでの表示部3における電話モード画面の表示状態を示している。以下、これらの図を用いて電話番号登録モード時における腕時計1の操作方法について説明する。

【0031】ステップST1、ステップST2 電話モードに入る

時計モードの状態では機能ボタンスイッチ11を押すと、表示部3に図5のような電話モード画面が表示される（ステップST1）。表示部上部3aには、例えば電波状況を表す「Y」が表示されている。「Y」が多いほど、電波状況が良いことを表す。次に決定ボタンスイッチ12を押すと、電話モード画面を表示する。決定ボタンスイッチ12を押すと、電話モードに入る（ステップST2）。

【0032】ステップST3、ステップST4 電話番号登録モードに入る

サブ機能ボタンスイッチ13を押すと、電話モードの詳細な機能が表示される。さらにサブ機能ボタンスイッチ13を押すと、別のサブ機能（例えば、着信を振動で伝えるためのバイブレータ設定機能等）が表示される。ここでは、特に電話番号登録モードについて説明する。サブ機能として、電話番号登録モード画面を表示した状態（ステップST3）で決定ボタンスイッチ12を押すと、図12のように電話番号登録モードに入る（ステッ

プST4）。

【0033】ステップST5、ステップST6、ステップST7 名前を入力

電話番号登録モードに入ると、図12のようにカーソルは表示部中部3bに配置されている。カーソル位置は、例えば反転表示されているおり、図12の表示部中部3bのようになっている。この状態で、ジョグダイヤル2を回転させると、ジョグダイヤル2の回転に合わせて設定された所定の順番の文字等が表示される。使用者は、所望の文字等が表示されたら、決定ボタンスイッチ12を押すことにより1文字決定されて、図13のように次の（例えば右の）フィールドに移る。そして、最後の文字を表示したら、決定ボタンスイッチ12を例えば2回押すことにより（ステップST8）、名前の入力を終了する。名前の入力が終了すると、図14のように表示部下部3cにカーソルが移る。

【0034】ステップST9、ステップST10、ステップST11 電話番号を入力

表示部下部3cは、電話番号を入力する欄である。ここでも、前述した文字入力同様に、図15のように電話番号をジョグダイヤルにて入力する。入力方法は、名前の入力と同様である（ステップST9、ステップST10）。最後の数字を入力したら、決定ボタンスイッチ12を2回押す（ステップST12）。

【0035】ステップST13、ステップST14、ステップST15 登録番号を入力

電話番号の入力が終了すると、図16のように表示部上部3aにカーソルが移る。表示部上部3aは、登録番号を入力する欄である。ここでも、前述した文字入力同様に、図17のように電話番号をジョグダイヤルにて入力する。最後の数字を入力したら、決定ボタンスイッチ12を2回押す（ステップST16）。以上で電話番号登録モードの操作が終了する。尚、入力順は、名前、電話番号、登録番号の順で説明しているが、これに限られない。

【0036】操作例2 留守番電話再生モード

図19及び図20は、腕時計1の電話モードのさらに別のサブ機能である留守番電話再生モードの操作方法を示すフローチャートである。

ステップST20、ステップST21 登録番号を入力

機能11ボタンスイッチを押すと、表示部3に図5のような電話モード画面が表示される（ステップST20）。表示部上部3aに表示されており内容は、前述したとおりである。決定ボタンスイッチ12を押すことにより電話モードに入る（ステップST21）。

【0037】ステップST22、ステップST23 留守番電話再生モードに入る

サブ機能ボタンスイッチ3を押すと、電話モードのさらに詳細な機能が表示される。さらにサブ機能ボタンスイッチ3を押すと、次のサブ機能が表示されるようになっ

ている。ここでは、特に留守番電話再生モードについて説明する。サブ機能として、留守番電話モード画面を表示した状態（ステップ22）で決定ボタンスイッチ12を押す（ステップST23）と、留守番電話再生モードに入る。

【0038】ステップST24、25、26、27 留守番電話数管理センターへの接続

ジョグダイヤル2を回転させて、図21のように留守番電話管理センターの電話番号を表示する（ステップST24）。次に、決定ボタンスイッチ12を押して、CPU15から送受信回路部14に通信指令を出して留守番電話管理センターへ接続する（ステップST25）。腕時計1は、図5のように留守番電話登録数を受信し、通信を切断し（ステップST26）、表示部3にその数を表示する（ステップST27）。

【0039】ステップST28、29、30、31 留守番電話センターへの接続

ジョグダイヤル2を回転させて、図21のように留守番電話センターの電話番号を表示する（ステップST28）。次に、決定ボタンスイッチ12を押すと、CPU15から送受信回路部14に通信指令を出して留守番電話センターへ接続する（ステップST29）。腕時計1は、図5のように留守番電話内容データを受信し、通信を切断し（ステップST30）、スピーカー4からその内容出力する（ステップST31）。尚、留守番電話管理センターと留守番電話センターは、別々となっているが、一体化されている場合も含むものとする。この場合、通信回数は1回で済む。

【0040】この発明の実施形態によれば、腕時計1には、ジョグダイヤル2が設けられているため操作が簡単である。

【0041】ところでこの発明は上述した実施形態に限定されるものではない。上述の実施の形態において、機構部50が計時機能を持たないで、その他の複数の機能を有するように構成しても良い。この場合、時計ではなくが、この発明はいかなる名称であるかを問わず、このような電子機器にも適用される。さらに、この発明の好ましい実施の形態である腕時計では、3つの選択手段を有しているが、3つ以上の選択手段を有していても良く、3つ未満の選択手段で構成しても良い。ジョグダイヤル2による文字や数字等の入力、電話モードのみを説明しているが、電話モード以外のモードで使用できてもよい。

【0042】ジョグダイヤルの使用例は、上述したもののみにかぎられない。

時計モード

時計モードのストップウォッチ機能を使用可能とすかどうか（ON/OFF）を、設定するのにジョグダイヤル2を使用できてもよい。

【0043】電話モード

電話モードのバイブレータ設定機能にて、バイブレータ機能を使用するかどうか（ON/OFF）をジョグダイヤル2を回転させることにより、ON又はOFFを表示することに適用してもよい。

翻訳モード

翻訳モードの翻訳元言語や翻訳後言語の表示にも、ジョグダイヤル2が使用できてもよい。

【0044】計算機モード

計算する場合に、マイク5から音声入力により数字入力する音声入力モード（図7の表示部上部3aの口のマークの表示）とペン型の操作具によりタッチパネル23に書き込んで、数字を文字認識させる文字認識入力モード（図22の表示部上部3aの鉛筆のマークの表示）とを切り替えるのにジョグダイヤル2を使用できても良い。

【0045】

【発明の効果】以上説明したように、この発明によれば、常時携帯しやすく、簡単に操作することのできる多機能な腕時計を提供することができる。

【図面の簡単な説明】

【図1】この発明の好ましい実施形態である腕時計を示す平面図。

【図2】図1の腕時計の内部の電子的な機能を示すハードウェア構成図。

【図3】図2のEEPROMに格納されている機能を示すソフトウェア構成図。

【図4】図1のジョグダイヤルの機構を示す平面図。

【図5】図1の腕時計の時計モード画面を示す平面図。

【図6】図1の腕時計の翻訳モード画面を示す平面図。

【図7】図1の腕時計の計算モード画面を示す平面図。

【図8】図1の腕時計のゲームモード画面を示す平面図。

【図9】図1の腕時計が備える電話モードの電話番号登録モードの操作方法を示すフローチャート。

【図10】図9のフローチャートの続きを示すフローチャート。

【図11】図10のフローチャートの続きを示すフローチャート。

【図12】図1の腕時計の時計モード画面を示す平面図。

【図13】図1の腕時計の時計モード画面を示す平面図。

【図14】図1の腕時計の時計モード画面を示す平面図。

【図15】図1の腕時計の時計モード画面を示す平面図。

【図16】図1の腕時計の時計モード画面を示す平面図。

【図17】図1の腕時計の時計モード画面を示す平面図。

【図18】図1の腕時計の時計モード画面を示す平面図。

図。

【図19】図1の腕時計が備える電話モードの留守番電話再生モードの操作方法を示すフローチャート。

【図20】図19のフローチャートの続きを示すフローチャート。

【図21】図1の腕時計の時計モード画面を示す平面図。

【図22】図1の腕時計の時計モード画面を示す平面図。

【図23】図1の腕時計の時計モード画面を示す平面

図。

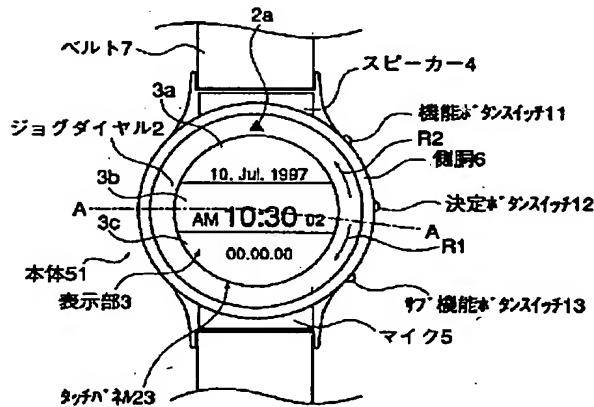
【図24】従来の腕時計を示す平面図。

【図25】従来の携帯型電子機器を示す平面図。

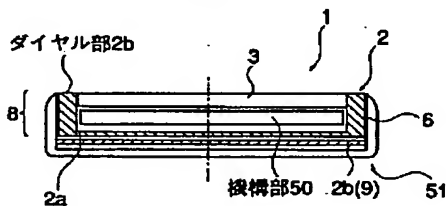
【符号の説明】

1・・・腕時計、2・・・ジョグダイヤル（回転操作手段）、3・・・表示部（表示手段）11・・・機能ボタンスイッチ（第1選択手段、選択手段）、12・・・決定ボタンスイッチ（第3選択手段、選択手段）、13・・・サブ機能ボタンスイッチ（第2選択手段、選択手段）、50・・・機構部、51・・・本体

【図1】

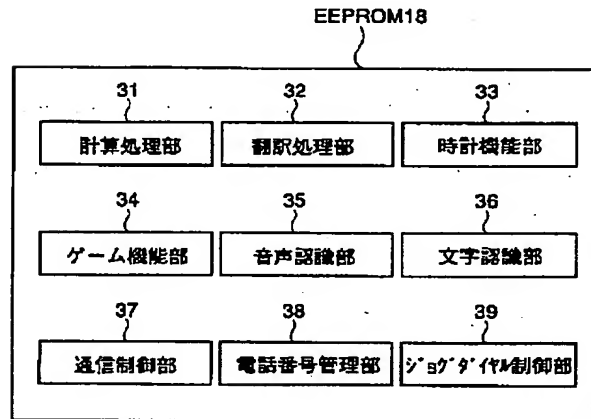


(A)

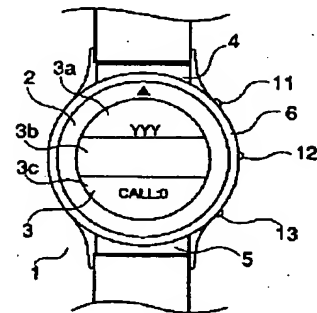


(B)

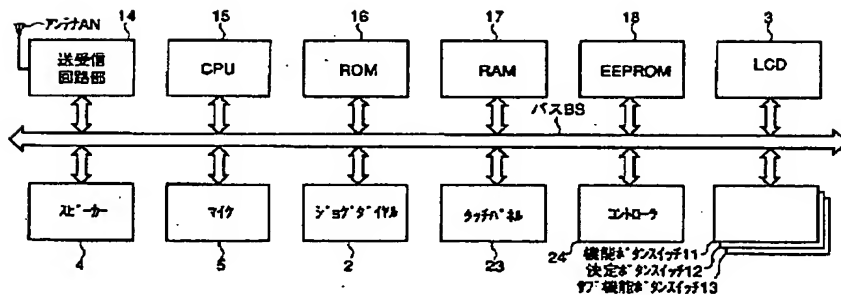
【図3】



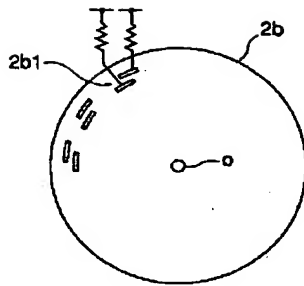
【図5】



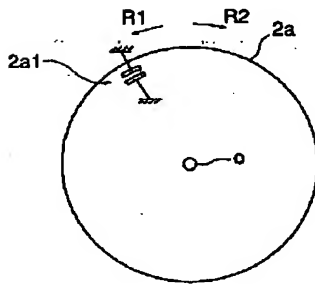
【図2】



【図 4】

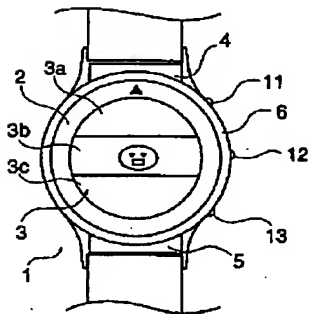


(A)

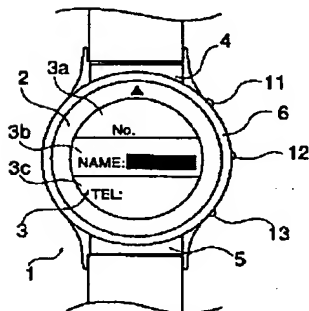


(B)

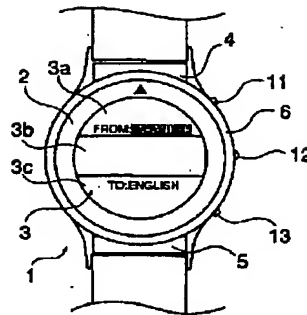
【図 8】



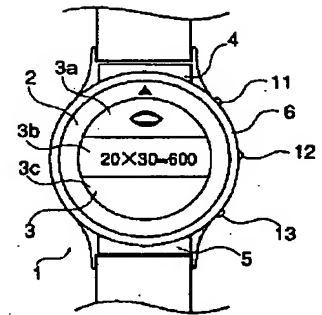
【図 12】



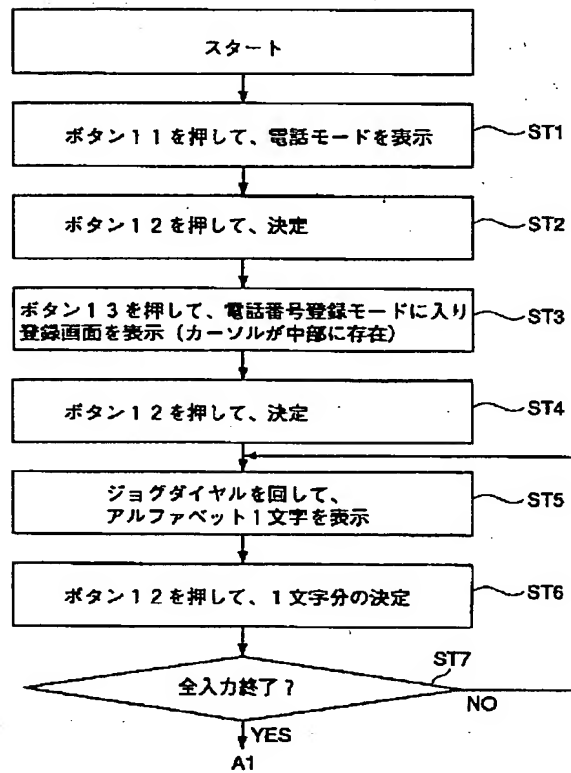
【図 6】



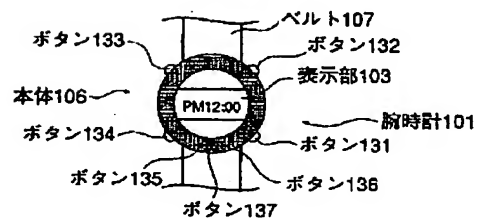
【図 7】



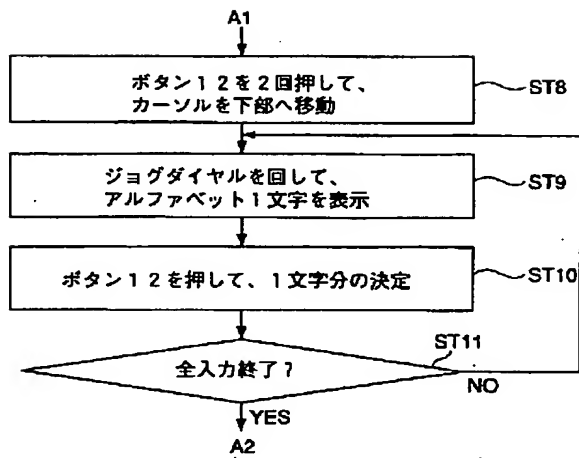
【図 9】



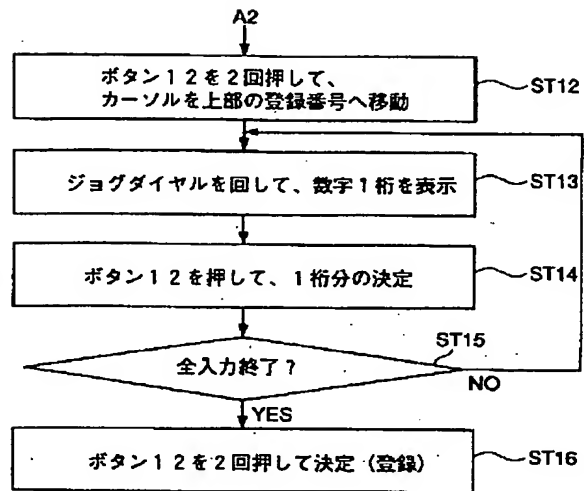
【図 24】



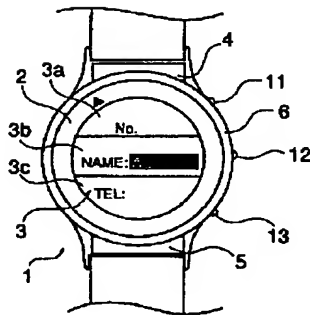
【図 10】



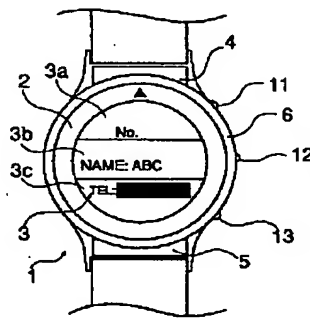
【図 11】



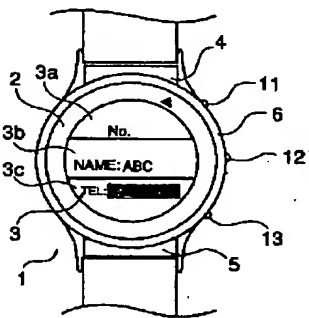
【図 13】



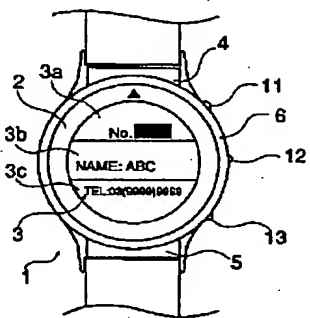
【図 14】



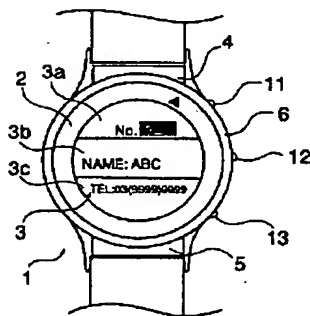
【図 15】



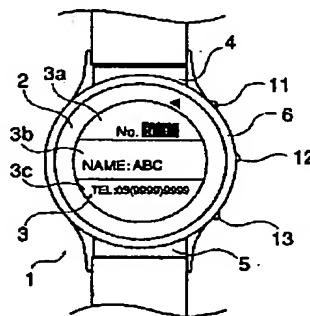
【図 16】



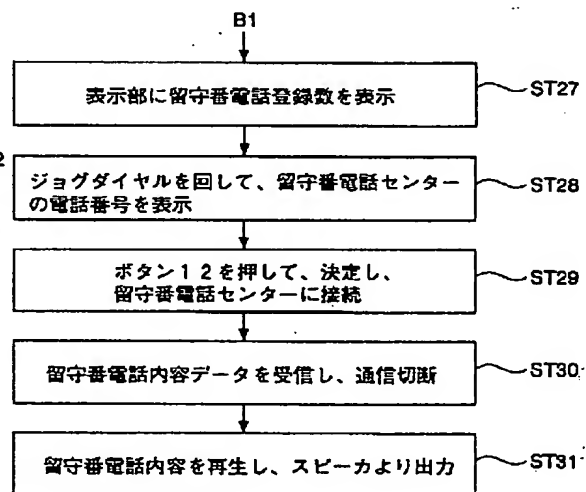
【図 17】



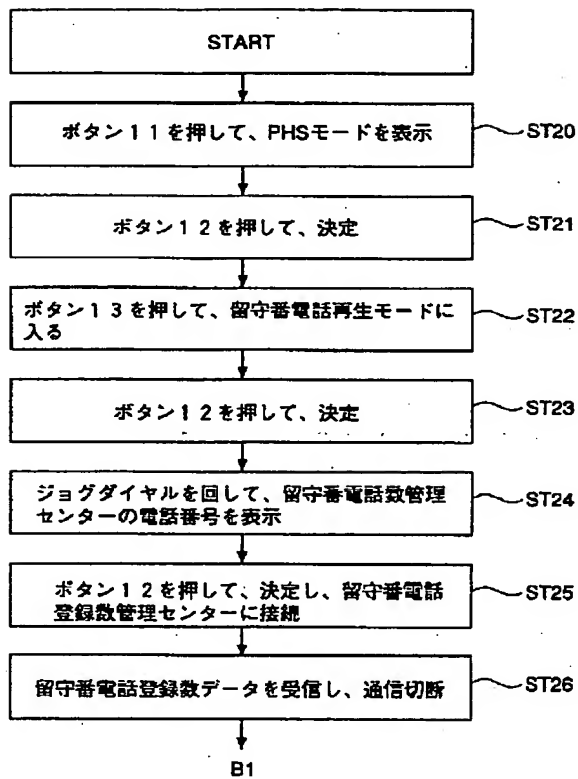
【図 18】



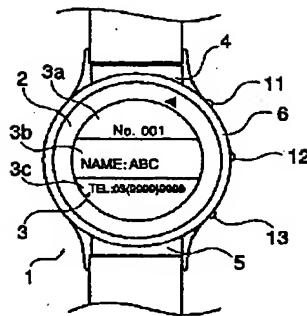
【図 20】



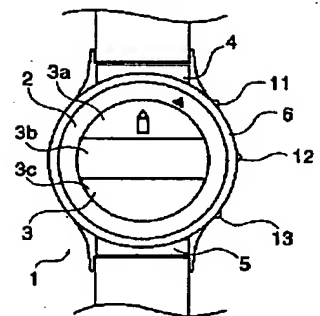
【図 19】



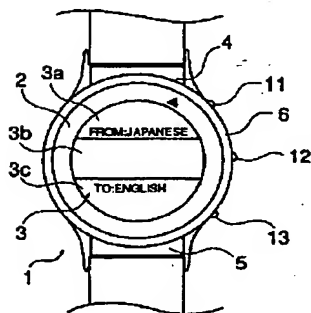
【図 21】



【図 22】



【図 23】



【図 25】

